

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method of determining a path along some of a plurality of points in a virtual environment comprising a plurality of initially defined points, and obstructions through which the path cannot pass, and in which two points are said to have line of sight if a straight line link between the two points does not pass through any of the obstructions, the method comprising:

(a) selecting, using a computer system having one or more computer processors, a start point and a destination point for said path in said virtual environment;

(b) dynamically redefining, using the computer system, the a topology of the virtual environment by generating a plurality of additional points, wherein said plurality of additional points are generated by repeating the following step:

defining a new point located on a midpoint of a line of sight link between two existing points;

(c) calculating, using the computer system, the path based on any combination of new and/or initially defined points between said start point and said end point.

2. (Currently Amended) A method as claimed in claim 1, wherein said step of dynamically redefining the topology of the virtual environment comprises increasing the density of ~~the a~~ nodal mesh density between said start point and said end point compared to the density of the nodal mesh prior to the selection of a start point and an end point for said path.

3. (Previously Presented) A method as claimed in claim 1, wherein said virtual environment comprises a representation of a virtual world.

4. (Canceled)

5. (Previously Presented) A method according to claim 1, further comprising in (b) the step of:

deleting the new point if it is less than a predefined distance from another of the points.

6. (Original) A method according to claim 5, wherein the predefined distance varies in different regions of the virtual environment.

7. (Currently Amended) A method according to claim 1, further comprising identifying a link as not being suitable for providing ~~the a~~ location for a new point if said link intersects another one of said links which is shorter.

8. (Previously Presented) A method according to claim 1, further comprising deleting a new point if it does not have line of sight to each of a pair of points which do not have line of sight to each other.

9. (Previously Presented) A method according to claim 1, further comprising deleting a new point if it does not form part of a path between two other nodes that is shorter than the

shortest path which would exist between said two points without said new point.

10. (Previously Presented) A method according to claim 1, further comprising receiving an indication from a user that they desire a path to be calculated, and wherein said step (b) occurs after said indication has been received.

11. (Original) A method according to claim 10, in which the virtual world comprises a plurality of regions each containing one or more points, and in which the step (b) is performed in relation to one or more of the regions prior to receiving said indication, and step (a) is performed in relation to other one or more of the regions after said indication has been received.

12. (Original) A method according to claim 11, in which said other one or more regions contain obstacles which move within the virtual environment.

13. (Original) A method according to claim 11 in which said other one or more regions contain a point which has been created by the user as representing the start or the destination point for said path.

14. (Previously Presented) A method according to claim 1 further comprising defining one or more feature entities within the environment having associated regions of influence, and calculating interest values in respect of at least some of the points in dependence upon whether or not they fall within a region of influence, wherein the step of calculating the path takes into consideration the interest values.

15. (Currently Amended) A method according to claim 14 wherein the or each interest value varies in inverse dependence upon the a Euclidean distance of the respective point from the centre of the respective region of influence.

16. (Currently Amended) A method of determining a route along some of a plurality of points in a representation of a real or virtual environment the method comprising:

(a) defining, using a computer system having one or more computer processors, one or more feature entities within the environment having associated regions of influence;

(b) calculating, using the computer system, interest values in respect of at least some of the points in dependence on whether or not they fall within a region of influence; and

(c) calculating, using the computer system, the route based on the interest values calculated in step (b).

17. (Currently Amended) A method of controlling the field of view of a virtual entity travelling through a virtual world, the method comprising:

associating, using a computer system having one or more computer processors, with one or more other virtual entities a region of influence; and

generating, using the computer system, a field of view parameter in respect of the travelling virtual entity which controls the field of view associated with the entity as it travels through the virtual world;

wherein the field of view parameter is calculated in a manner which depends upon whether the virtual entity is within or without a region of influence.

18. (Currently Amended) A system comprising:
a non-transitory storage medium for storing a representation of a virtual world, the representation comprising a plurality of initially defined points, and obstructions through which the path cannot pass, and in which two points are said to have line of sight if a straight line link between the two points does not pass through any of the obstructions[.]; and
~~the system being arranged~~at least one processor configured to determine a path along some of a plurality of points in said representation by

- (a) defining a plurality of additional points by repeating the following step:
defining a new point located on a midpoint of a line of sight link between two existing points; and
- (b) calculating the path based on any combination of new and/or initially defined points.

19. (Canceled)

20. (Previously Presented) A system according to claim 18, further arranged in (a) to:
delete the new point if it is less than a predefined distance from another of the points.

21. (Original) A system according to claim 20, wherein the predefined distance varies in different regions of the virtual world.

22. (Previously Presented) A system according to claim 18, further arranged to identify a link as not being suitable for providing the location for a new point if said link intersects

another one of said links which is shorter.

23. (Previously Presented) A system according to claim 18, further arranged to delete a new point if it does not have line of sight to each of a pair of points which do not have line of sight to each other.

24. (Previously Presented) A system according to claim 18, further arranged to delete a new point if it does not form part of a path between two other nodes that is shorter than the shortest path which would exist between said two points without said new point.

25. (Previously Presented) A system according to claim 18, further arranged to receive an indication from a user that they desire a path to be calculated, and wherein said step (a) is performed after said indication has been received.

26. (Original) A system according to claim 25, in which the virtual world comprises a plurality of regions each containing one or more points, and in the system is arranged to perform step (a) in relation to one or more of the regions prior to receiving said indication, and to perform step (a) in relation to other one or more of the regions after receiving said indication.

27. (Original) A system according to claim 26 in which said other one or more regions contain obstacles which move within the virtual world.

28. (Original) A system according to claim 26 in which said other one or more regions contain a point which has been created by the user as representing a start or destination point for said path.

29. (Previously Presented) A system according to claim 18 further including: storage means storing a plurality of data groups, each of which stores data associated with a feature entity within the representation including data defining a region of influence associated with the feature entity; calculation means for calculating interest values in respect of at least some of the points in dependence upon whether or not they fall within a region of influence; and processing means for generating a route along a plurality of the points in dependence upon the interest values.

30. (Original) Apparatus for generating a route along a plurality of nodes in a representation of a real or virtual environment, the apparatus comprising:

(a) storage means storing a plurality of data groups, each of which stores data associated with a feature entity within the representation including data defining a region of influence associated with the feature entity;

(b) calculation means for calculating interest values in respect of at least some of the nodes in dependence upon whether or not they fall within a region of influence; and

(c) processing means for generating a route along a plurality of nodes in dependence upon the calculated interest values.

31. (Original) Apparatus for controlling the field of view of a virtual entity travelling through a virtual environment, the apparatus comprising:

(a) storage means storing a plurality of data groups, each of which stores data associated with a feature entity within the representation including data defining a region of influence associated with the feature entity; and

(b) processing means for generating a field of view parameter or set of parameter in respect of the travelling virtual entity which controls the field of view associated with the entity as it travels through the virtual world wherein the field of view parameter or set of parameters is generated in a manner which depends upon whether the virtual entity is within or without a region of influence.

32. (Currently Amended) A method of determining a path along some of a plurality of points in a virtual environment comprising a plurality of initially defined points, and obstructions through which the path cannot pass, and in which two points are said to have line of sight if a straight line link between the two points does not pass through any of the obstructions, the method comprising:

(a) selecting, using a computer system having one or more computer processors, a start point and an end point for said path in said virtual environment;

(b) dynamically, using the computer system, redefining ~~the~~ a topology of the virtual environment in the vicinity of said start point and said end point and ~~the~~ a region between said start point and said end point by generating a plurality of additional points, wherein said plurality of additional points are generated by repeating the following step:

defining a new point located between a first existing point and a second existing point,

wherein a first line between the first point and the new point and a second line between the new point and the second point do not pass through any of the obstructions; and

(c) calculating, using the computer system, the path based on any combination of new and/or initially defined points, wherein the angle of deviation of the first line to a line between the first and second points is constrained.

33. (Original) A method as claimed in claim 32, wherein the constraint is imposed by assigning a varying angle of deviation cost value in dependence on the angle to which the first line deviates from the second line.

34. (Currently Amended) A method as claimed in claim ~~38~~32, wherein the angle of deviation is constrained to a predetermined range.

35. (Currently Amended) A method as claimed in claim ~~41~~34, wherein the range of the angle of deviation is determined as a function of a range of angles within which the first line approaches the new point from the first point, and a predetermine angle of deviation.

36. (Previously Presented) A method as claimed in claim 32, wherein said method is performed to create the content of the virtual environment.

37. (Previously Presented) A method as claimed in claim 32, wherein said method is performed after the content creation of the virtual environment to dynamically determine the path.

38. (Previously Presented) A method as claimed in claim 32, wherein said path determined has a dynamically changing destination node.

39. (Currently Amended) A method of generating an automated path along some of a plurality of points in a virtual environment in which the rate of curvature of the path as a function of distance along the path is constrained, the method comprising determining the path in a topology comprising a plurality of initially defined points, and obstructions through which the path cannot pass, and in which two points are said to have line of sight in said topology if a straight line link between the two points does not pass through any of the obstructions, the method comprising:

(a) selecting, using a computer system having one or more computer processors, a start point and an end point for said path in said virtual environment;

(b) dynamically, using the computer system, redefining the topology of the virtual environment in the vicinity of said start point and said end point and the region between said start point and said end point by generating a plurality of additional points, wherein said plurality of additional points are generated by repeating the following step:

defining a new point located between a first existing point and a second existing point, wherein a first line between the first point and the new point and a second line between the new point and the second point do not pass through any of the obstructions; and

(c) calculating, using the computer system, the path based on any combination of new and/or initially defined points, wherein the angle of deviation of the first line to a line between the first and second points is constrained.

40. (Original) A method as claimed in claim 39, wherein the speed of navigation along the path is determined as a function of the rate at which the degree of curvature of the path changes as a function of distance along the path.

41. (Currently Amended) A system for determining a path along some of a plurality of points in a representation of an environment, the representation comprising a plurality of initially defined points, and obstructions through which the path cannot pass, the system comprising:

processing means to define a plurality of additional points by repeatedly defining a new point located between a first existing point and a second existing point, wherein a first line between the first point and the new point and a second line between the new point and the second point do not pass through any of the obstructions; and

processing means to calculate the path based on any combination of new and/or initially defined points, wherein the an angle of deviation of the first line to a line between the first and second points is constrained to ensure that the rate at which the a curvature of the path varies as a function of position along the path falls within a predetermined range of values.

42. (Original) A system as claimed in claim 41, wherein the system further comprises means to enable a user to be automatically navigated along said path.

43. (Previously Presented) A system as claimed in claim 41, wherein the system further comprises means to enable a user to select rate at which the curvature of the path varies as a function of position along the path.

44. (Currently Amended) A user interface for a navigational system as claimed in claim 41, wherein the user interface is arranged to provide said means to enable ~~the~~ a user to select the rate at which the curvature of the path varies as a function of position along the path.

45. (Currently Amended) A non-transitory storage medium carrying computer readable code representing instructions for causing one or more processors, upon execution of the code by the one or more processors, to perform [[the]] method according to claim 1 when the instructions are executed by the processor or processors a method of determining a path along some of a plurality of points in a virtual environment comprising a plurality of initially defined points, and obstructions through which the path cannot pass, and in which two points are said to have line of sight if a straight line link between the two points does not pass through any of the obstructions, the method comprising:

(a) selecting a start point and a destination point for said path in said virtual environment;
(b) dynamically redefining a topology of the virtual environment by generating a plurality of additional points, wherein said plurality of additional points are generated by repeating the following step:

defining a new point located on a midpoint of a line of sight link between two existing points;

(c) calculating the path based on any combination of new and/or initially defined points between said start point and said end point.

46. (Canceled)

47. (Canceled)

48. (Currently Amended) A non-transitory storage medium carrying computer readable code representing instructions for causing one or more processors to operate as the system according to claim 18 ~~to~~ when the instructions are executed by the processor or processors.

49.-50. (Canceled)